

CASE STUDY

Energy Efficiency and Conservation Block Grants

Town of Darby

Project Completion Date
October 2011

Project Funding
Federal: \$200,000
Match: \$10,000

Estimated Annual Savings
\$19,449
61,222 kWh

The Town of Darby sits at the base of the Bitterroot Mountains in southwestern Montana, surrounded by national and private forest land. In 2003 the town turned to its area natural resources as a more energy-efficient source for heating its school complex and replaced the oil-fired steam boilers with a central heating plant fueled by wood chips.

Darby gained further energy conservation savings in 2010 by installing direct digital controls on the biomass system with the help of a competitive federal award from the Montana Department of Environmental Quality (DEQ). The results have been dramatic.

"Last year, our heating bill was about \$20,000; with the old oil boilers and pneumatic controls, that would have been about \$180,000 to \$200,000," said Rick Scheele, the town's mayor and the maintenance manager for the school district.

FAILED CONTROLS

Darby's elementary, middle, and high schools are grouped together on a single campus in a configuration triggered by a fire in the early 1970s, which destroyed both the high school and the elementary school. To replace the elementary school, an addition was built onto the existing middle school for a combined total of 39,925 square feet. The high school gymnasium, which hadn't been destroyed in the fire, became the middle school gym. A new 46,270 square-foot high school building was constructed to house classrooms, a gymnasium, and administration offices. There is also a shop in a separate building.



DARBY ELEMENTARY

The pneumatic control system operating the schools' mechanical system was installed after the fire, making it more than 30 years old. Because it was nearly impossible to find parts when repairs were needed, some components failed entirely over time. For example, the control regulating a nighttime temperature setback had failed, resulting in the need for someone to manually turn the heat down at night and up for day. Oftentimes, the system was just left on, resulting in wasted energy.

The pneumatic controls also required yearly calibration and maintenance inspection by a certified technician, which was a costly expense for the school as the closest technicians were in Missoula, 60 miles away. "We knew we had to get rid of the antiquated controls," Scheele said. "We had started to look into how we could fund it when we had the opportunity to try for the grant."

A COMMUNITY PARTNERSHIP FOR SAVINGS

The school district's central heating plant provides low-pressure steam that serves five air handlers and heat exchangers, which generate 180 degree heating water. The water is pumped to the unit ventilators and other equipment. By installing direct digital controls, the town gained more-exacting control of the heating system. The controls are connected to sensors located throughout the school complex and therefore automatically respond to up-to-date data. Scheele can monitor the system online and make adjustments as needed.

The district also used award funds to replace the air-mixing dampers and actuators in the heating system. This reduces the running time of the mechanical equipment as well as the amount of ventilation air that is heated unnecessarily.

With the award and some town funds, Darby was able to replace about 90 percent of the pneumatic controls on its mechanical systems, focusing on the areas of greatest need first. It is now exploring ways to finance the remaining 10 percent. In the meantime, the town of fewer than 900 residents continues to help the district conserve its energy costs through the Fuels for Schools program.

"We buy whole logs from loggers for our wood chipper, but landowners who are doing their own hazardous-fuels reduction or beetle-kill logging can donate their logs as well. So it is a community partnership," said Scheele.

DEQ provided funding for this project through a one-time Energy Efficiency and Conservation Block Grant from the U.S. Department of Energy. No additional funds are expected.



DIRECT DIGITAL CONTROLS